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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/709,523	11/13/2000	Seong-Kwcon Ha	041993-5151	4416

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1800 M STREET NW
WASHINGTON, DC 20036-5869

EXAMINER

FINSMITH, DAVID C

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 12/21/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/709,523

Applicant(s)

HA ET AL.

Examiner

David C Finsmith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2000 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

1. Claims 1, and 2 are rejected under 35 U.S.C. 102(e) as being unpatentable by Chun et al (U.S. Patent Number 6,291,259).

In regard to claim 1, Chun et al teach a semiconductor package comprising:
a semiconductor substrate;
a plurality of chip pads separately formed on an upper surface of the semiconductor substrate;
an irregular metal pattern electrically connected to the plurality of chip pads; and an external terminal electrically connected to the metal pattern (see figure 3 columns 1 and 2).

In regard to claim 2, Chun et al teach a semiconductor package comprising:
a semiconductor substrate;
a plurality of chip pads separately formed on an upper surface of the semiconductor substrate;
a first metal pattern formed on the upper surfaces of the plurality of chip pads;

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a second metal pattern having an irregular shape and formed on an upper surface of the first metal pattern; and an external terminal electrically connected to the metal pattern (see figure 5 and columns 3 and 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 3, 4, 5, 8, 9, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun in view of Kwon et al (U.S. Patent Number 6,235,552).

In regard to claim 3, Chun teaches all of the recited invention except for the first metal pattern including titanium.

Kwon et al teaches a first metal pattern of titanium (see column 3 lines 45-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a first metal pattern of titanium in the device structure of Chun to improve the adhesion properties of the structure and improve device lifetime.

In regard to claim 4, Chun teaches all of the recited invention except for a second metal pattern that includes nickel.

Kwon et al teaches a second metal pattern that includes nickel.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use nickel in the second metal pattern in the device of Chun in

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order to provide improved adhesion properties between the metal and solder in the device structure.

In regard to claim 5, Chun teaches all of the recited invention except:

A first insulation layer formed on a region of the upper surface of the semiconductor substrate not occupied by the plurality of chip pads; and a second insulation layer formed on upper surfaces of the first insulation layer and the first metal pattern.

Kwon et al teach a first insulation layer formed on a region of the upper surface of the semiconductor substrate not occupied by the plurality of chip pads; and a second insulation layer formed on upper surfaces of the first insulation layer and the first metal pattern (see figure 28 and abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a first insulation layer disposed as described above and a second insulation layer disposed as described above in the device of Chun to seal up the device and provide improved protection against electrostatic discharge.

In regard to claim 8, Chun in view of Kwon et al teaches all of the recited invention of claim 5.

Further Kwon et al teach a solder mask formed on an upper surface of the second insulation layer (see figure 27 and column 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a solder mask on the upper surface in the device of claim 5 to economically electrically interconnect the device.

In regard to claim 9, Chun in view of Kwon et al teaches all of the recited invention of claim 5.

Further Kwon et al teach an external terminal which includes a solder ball.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the device of claim 5 with an external terminal including a solder ball to economically interconnect the device and save steps in packaging the device.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chun in view of Kwon et al and Chia et al.

Chun in view of Kwon et al teaches all of the recited invention of except a first insulation layer including polyimide or benzocyclobutene.

Chia et al (U.S. Patent Number 6,057,594) teaches a first insulation layer including polyimide or benzocyclobutene (see column 2 lines 50-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a first insulation layer of polyimide in the device of claim 5 in order to prevent voids in the structure from occurring during processing and to improve high temperature tolerance during processing.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chun in view of Kwon et al and Arndt et al (U.S. Patent Number (6,278,171).

Chun in view of Kwon et al teach all of the recited invention except a second insulation layer including a photoresist or benzocyclobutene.

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Arndt et al teach a second insulation layer including a photoresist or benzocyclobutene (see column 5 lines 50-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a photoresist or benzocyclobutene in the second insulation layer of the device of claim 5 in order to allow the structure to be patterned by using photolithography.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chun in view of Kwon et al and Hsuan et al (U.S. Patent Number 6,268,642).

Chun in view of Kwon et al teach all of the recited invention except the semiconductor substrate includes a wafer.

Hsuan et al teach the semiconductor substrate includes a wafer (see abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a wafer with the semiconductor substrate in the device of claim 9 to reduce the overall volume of the package.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C Finsmith whose telephone number is 703-308-0121. The examiner can normally be reached between 8 A.M.-5 P.M. from Monday - Friday

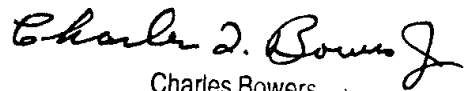
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers can be reached on 703-308-2417. The fax phone numbers for TC 2800 where this application is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-6785.

D.F.

December 17, 2001



Charles Bowers
Supervisory Patent Examiner
Technology Center 2800